Pauling: Charismatic, Controversial, and Tough

Reviewed by **John D. Roberts**

Linus Pauling is beyond any doubt one of the great figures of 20th century science—imaginative, charismatic, wide-ranging, and controversial. The story of his life is important for the history of science and the relationship between science and government, as well as for its inspiration for potential young scientists and, indeed also, for its intense human interest. Is Anthony Serafini's "Linus Pauling: A Man and His Science," the definitive book for these purposes? It is interesting and easy reading (at least for scientists). But definitive it is not.

For example, this book is not the place to find out about Pauling's chemical achievements. The author, who has a Ph.D. in philosophy and teaches philosophy and religion at Centenary College, Hackettstown, N.J., does little more than quote others on Pauling's work on chemical bonding. Nothing is said about Pauling and E. Bright Wilson Jr.'s "Introduction to Quantum Mechanics"; nor about Pauling's superb undergraduate textbooks; nor of his teaching; nor of the steady stream of world-famous chemists, such as Wilson, George Willard Wheland, Martin Karplus, William Lipscomb, Alexander Rich, Jack Dunitz, and Mathew Meselson, who were so strongly influenced by Pauling at California Institute of Technology.

The account of Pauling's early life is very interesting (if accurate), and there is substantial detail about his entry into molecular biology, his efforts to halt nuclear testing, and his advocacy of vitamin C to reduce incidence of the common cold, as well as its use in cancer therapy. Serafini's approach emphasizes the sensational and the controversies, for which there is ample documentation. But it should not be forgotten how tough, tireless, persistent, and shrewd Pauling was in pursuing his goals against great odds, entrenched dogma, and personal animosities.

Pauling, with 1954 Nobel Prize, surrounded by the ladies of his family

A recent biography gives short shrift to Linus Pauling's chemical achievements and his success at teaching

"Linus Pauling: A Man and His Science" by Anthony Serafini, Paragon House, 90 Fifth Ave., New York, N.Y. 10011, 1989, 310 pages, **$22.95**

As a philosopher, Serafini suggests that Pauling will be excluded from "history's great thinkers" by his unwillingness to reach out and grasp the philosophical and other humanistic dimensions of quantum mechanics, and especially the uncertainty principle, during the period of his studies in Germany, when he was but 26. Perhaps so, but although argumentation on determinism has been profound and is currently very interesting with respect to the theory of chaos, Pauling showed real genius in seeing where quantum mechanics could lead, rather than getting bogged down in its philosophical paradoxes. Numerous other judgments are made by Serafini, but not always consistently. Certainly, such judgments are within his prerogatives, although I do not find many of them convincing.

One's skepticism of the level of accuracy of a book or news report is definitely aroused when events are described that one has personal knowledge of, or participated in, and these events are incorrectly reported (or are actually nonevents). With much of this sort of thing, the whole fabric of a report becomes doubtful. This is a serious problem with Serafini's book.

The text is set in two sizes of type. Smaller type is used for direct quotation, either of written material or of tape-recorded conversations. These seem generally accurate, even if devoid of the appropriate context.

The material set in larger type is something else again. The parts that cover matters that I actually know about are riddled with inaccuracies and incredibly poor checking of names. A few examples where I am involved directly should be illustrative. Thus, on page 63, I am quoted as being highly impressed with morning seminars given at Caltech before World War II, at a time when I was still an undergraduate at the University of California, Los Angeles, and had no connection with Caltech; page 73, I am not a student of Howard Lucas; page 236, while I did, indeed, once "go to the mat" with Linus on a professorial appointment, it was certainly not over the appointment of Harden McConnell. A few of the misspelled names or misidentifications: page 94, Dorothy Semenow, Caltech's first woman graduate student; page 88 and elsewhere, Carl Niemann; page 144, Charles C. Lauritsen, a renowned physicist; in the photographs, John Slater, of whom there is quite a bit in the text, is misidentified, as is Linda Kamb, Pauling's daughter. Some disputable flat-out

statements include: page 75, "protein molecules several feet long"; page 102, the hydrogen bond "discovered" by Maurice Huggins, when it dates back to at least 1912; page 141, Throop Hall at Caltech "flattened" by the 1971 earthquake; page 218, Don M. Yost "survived to 97!" (he was born in 1893 and died in 1977). The list is hardly reassuring to me about those events where I do not have direct knowledge.

With the Sturm und Drang that is commonly associated with Pauling, one might well wonder what it was really like to be his faculty colleague. I have been one since 1952, and it has been a most rewarding experience. As far as I know, Pauling only became acquainted with my work when I gave a couple of seminars at Caltech about 1950. Later, as chairman of the division of chemistry and chemical engineering, he conveyed Caltech's offer of a professorship with warmth and enthusiasm. He was extremely helpful in making the case to the institute for admission of women graduate students so that Semenow could transfer from Massachusetts Institute of Technology to continue her doctoral research with me. Then, in 1954, after some extended discussions, he put his weight behind acquiring a Varian NMR spectrometer to be used principally by my research group. He never attempted to influence the scope or direction of my work nor to instill any political wisdom.

The situation at Caltech during the active Pauling years was positively bucolic compared with the turbulent times I encountered when Arthur C. Cope was rebuilding the chemistry department at MIT. The Caltech professorial group was small, congenial, and had a high degree of collegial trust, which to some extent reflected the very successful Caltech student honor system. In every respect, our division was well run. When Pauling was in town, he could be consulted usually up to about 1 PM, when he went home to work on his research or writing. All matters relating to the laboratory were handled by J. Holmes Sturdivant, one of the most competent persons I have ever encountered. Sturdivant took care of virtually every nonacademic matter and seemed to have substantial powers to dispense the division's discretionary funds. Most of the academic functions were handled by faculty committees with power to act. In contrast to MIT, teaching of undergraduate courses was prized by the professors and, for many years, Pauling taught freshman chemistry himself, usually with backup from one of the younger faculty when he was out of town. Any of the professors could give a graduate course at any time, provided only that it was planned well enough in advance for a description to be submitted for largely routine approval by the whole Caltech faculty.

Pauling pleased me by his ability to delegate authority, his long look forward with respect to the division's future, his emphasis on research rather than courses to determine the fitness of graduate students for doctoral research, and his fostering of the general Caltech spirit of "let's do what's right for our students rather than adhering to rules." Serafini says that Caltech's A. A. Noyes and, to at least some degree Pauling himself, were antagonistic to organic chemistry. That does not fit with my understanding that Caltech wanted to hire both James B. Conant and Alexander Todd in the 1930s, and did bring aboard Carl Niemann, Laszlo Zechmeister, and Edwin R. Buchman during that period. Certainly, I found the atmosphere, the administration, the supporting staff, and magnificent younger physical chemistry colleagues, such as Verner Schomaker, Norman Davidson, and Harden McConnell, extremely important to my own chemical development.

It is true that the rapid growth of the division's research in the 1960s meant that, as division chairman, I had to ask Pauling to give up some laboratory space for young professors whose programs were rapidly expanding. While I am sure Pauling did not like it, he did not act "enraged," as Serafini suggests. In fact, he was wholly cooperative, which was a great relief to me, because going to him about this matter was not a mission that I relished. I was delighted later, when he resigned his professorship, that he was willing to retain a connection with the division as research associate.

Irrespective of their own political inclinations, the Caltech chemistry faculty has always held Pauling in the highest regard for his encouragement, his enhancement of the stature of Caltech chemistry, his enlivenment of seminars, his fantastic contributions to science, and his vivid demonstration that a rugged individualist can make a difference. The personal warmth that he expresses when he smiles and his large, luminous eyes beam at you is an unforgettable experience.

John D. Roberts, now Institute Professor of Chemistry, Emeritus, at California Institute of Technology, served as chairman of the division of chemistry and chemical engineering there from 1963 to 1968 and 1973 to 1974 and as vice president, provost, and dean of the faculty from 1980 to 1983. Priestley medalist for 1987, his autobiography will be published in early 1990. □

E. W. R. Steacie and Science in Canada. M. Christine King. xii + 243 pages. University of Toronto Press, 340 Nagel Dr., Buffalo, N.Y. 14225. 1989. $35.

Surface Preparation Techniques for Adhesive Bonding. Raymond F. Wegman. xxii + 150 pages. Noyes Publications, Mill Rd. at Grand Ave., Park Ridge, N.J. 07656. 1989. $42.

Symmetry in Molecules and Crystals. M. F. C. Ladd. 274 pages. John Wiley & Sons, 605 Third Ave., New York, N.Y. 10016. 1989. $51.95.

Thermal Accommodation and Adsorption Coefficients of Gases. Vol. 2-1. S. C. Saxena, R. K. Joshi. xxxvi + 412 pages. Hemisphere Publishing Corp., 79 Madison Ave., New York, N.Y. 10016-7892. 1989. $95.

Topological Methods in Chemistry. Richard E. Merrifield, Howard E. Simmons. ix + 233 pages. John Wiley & Sons, 605 Third Ave., New York, N.Y. 10016. 1989. $35.

Trends in Synthetic Carbohydrate Chemistry. ACS Symposium Series 386. Derek Horton, Lynn D. Hawkins, Glenn J. McGarvey, editors. xii + 345 pages. American Chemical Society, 1155—16th St., N.W., Washington, D.C. 20036. 1989. $69.95. □